

FORM PTO-1390 (Modified)
(REV 10-95)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

192381US2PCT

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/582170

INTERNATIONAL APPLICATION NO.
PCT/SE98/02357INTERNATIONAL FILING DATE
17 December 1998PRIORITY DATE CLAIMED
23 December 1997

TITLE OF INVENTION

PROCEDURE AND SYSTEM FOR POSITION MANAGEMENT IN A MOBILE TELEPHONE SYSTEM

APPLICANT(S) FOR DO/EO/US

Souhad AYOUB, et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:


13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☐ Certificate of Mailing by Express Mail
19. ☒ Other items or information:

Request for Consideration of Documents Cited in International Search Report

Notice of Priority

PCT/IB/304

PCT/IB/308

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.53(a)) 09/582170		INTERNATIONAL APPLICATION NO. PCT/SE98/02357		ATTORNEY'S DOCKET NUMBER 192381US2PCT	
20. The following fees are submitted:				CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :					
<input type="checkbox"/> Search Report has been prepared by the EPO or JPO \$840.00					
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) \$670.00					
<input type="checkbox"/> No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$760.00					
<input checked="" type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$970.00					
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) \$96.00					
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$970.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)). <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30				\$130.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	22 - 20 =	2	x \$18.00	\$36.00	
Independent claims	4 - 3 =	1	x \$78.00	\$78.00	
Multiple Dependent Claims (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$1,214.00	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). <input type="checkbox"/>				\$0.00	
SUBTOTAL =				\$1,214.00	
Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)). <input type="checkbox"/> 20 <input type="checkbox"/> 30 +				\$0.00	
TOTAL NATIONAL FEE =				\$1,214.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL FEES ENCLOSED =				\$1,214.00	
				Amount to be refunded	\$
				charged	\$
<input checked="" type="checkbox"/> A check in the amount of \$1,214.00 to cover the above fees is enclosed.					
<input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.					
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 15-0030 A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO:					
 22850 PATENT TRADEMARK OFFICE		NEUSTADT, P.C. Surinder Sachar Registration No. 34,423			
		SIGNATURE <i>Surinder Sachar</i>			
		NAME Marvin J. Spivak			
		24,913 REGISTRATION NUMBER			
		DATE <i>June 22, 2000</i>			

DOCKET NO. 192381US2PCT

IN RE APPLICATION OF: Souhad AYOUB, et al.

SERIAL NO.: NEW U.S. PCT APPLICATION (based on PCT/SE98/02357)

FILED: HEREWITH

FOR: PROCEDURE AND SYSTEM FOR POSITION MANAGEMENT IN A MOBILE TELEPHONE SYSTEM

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

Sir:

Transmitted herewith is an amendment in the above-identified application.

- ☒ No additional fee is required.
- ☐ Small entity status of this application under 37 C.F.R. §1.9 and §1.27 has been established by a verified statement previously submitted.
- ☐ Small entity status of this application under 37 C.F.R. §1.9 and §1.27 has been established by a verified statement submitted herewith.

☒ Additional documents filed herewith: Preliminary Amendment/PCT/IB/304/Check for \$1,214.00
Notice of Priority/Request for Consideration/PCT Transmittal Letter/PCT/IB/308/International Search Report
International Preliminary Examination Report

The fee has been calculated as shown below.

(Col. 1)		(Col. 2)		(Col. 3)	SMALL ENTITY		OTHER THAN A SMALL ENTITY	
	CLAIMS REMAINING AFTER		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		ADDITIONAL FEE		ADDITIONAL FEE
					RATE		RATE	
TOTAL	*22	MINUS	** 22	= 0	X9 =	\$	X18 =	\$.00
INDEP	*4	MINUS	*** 4	= 0	X39 =	\$	X78 =	\$.00
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM					+130=	\$	+260=	\$
TOTAL						\$	TOTAL	\$.00

A check in the amount of \$_____ is attached.

XX Please charge any additional fees for the papers being filed herewith and for which no check is enclosed herewith, or credit any overpayment to deposit Account No. 15-0030. A duplicate copy of this sheet is enclosed.

XX If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time may be charged to deposit Account No. 15-0030. A duplicate copy of this sheet is enclosed.

OBLON, SPIVAK, McCLELLAND,
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*If the entry in Column 2 is less than the entry in Column 1 write "0" in Column 3.

**If the "Highest Number Previously paid for" IN THIS SPACE is less than 20 write "20" in this space.

***If the "Highest Number Previously paid for" IN THIS SPACE is less than 3 write "3" in this space.

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09/582170

192381US2PCT

534 Rec'd PCT/PTC 22 JUN2000

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF:

SOUHAD AYOB ET AL

: ATTN: NEW APPLICATION DIVISION

SERIAL NO: NEW U.S. PCT APPLICATION :
(BASED ON PCT/SE/02357)

FILED: HERewith

FOR: PROCEDURE AND SYSTEM :
FOR POSITION MANAGEMENT
IN A MOBILE TELEPHONE
SYSTEM

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified
application as follows:

IN THE SPECIFICATION

Please amend the specification as follows:

Page 1, between prenumbered lines 3 and 5, insert

--BACKGROUND OF THE INVENTION

Field of the Invention--;

prenumbered line 9, delete in its entirety and insert therefor

--Discussion of the Background--.

Page 3, prenumbered line 22, delete in its entirety.

Page 4, line 1, delete in its entirety and insert therefor

--SUMMARY OF THE INVENTION--;

prenumbered line 10, delete in its entirety.

Page 5, prenumbered line 12, delete in its entirety and insert therefor

--BRIEF DESCRIPTION OF THE DRAWINGS--;

prenumbered line 25, delete in its entirety and insert therefor

--DESCRIPTION OF THE PREFERRED EMBODIMENTS--.

IN THE CLAIMS

Please amend the claims as follows:

Claim 3, line 1, delete "or 2".

Claim 5, line 1, delete "or 2".

Claim 6, line 1, delete "or 2".

Claim 7, line 1, delete "or 6".

Claim 8, line 1, delete "any of the previous";

line 2, change "claims" to --claim 1--.

Claim 9, line 1, delete "(18)";

line 3, delete "(24)";

line 9, delete "(26)".

Claim 10, line 4, delete "(28)";

line 7, delete "(30)".

Claim 12, line 4, delete "(28)";

line 7, delete "(32)";

line 9, delete "(34)";

line 11, delete "(36)".

Claim 13, line 4, delete "(38)";

line 6, delete "(40)";

line 9, delete "(32)";

line 11, delete "(34)";

line 13, delete "(36)".

Claim 14, line 2, delete "or 13".

Claim 15, lines 1-2, delete "any of the previous";

line 2, change "claims" to --claim 9--.

Claim 16, line 1, delete "(24)";

line 9, delete "(26)".

Claim 17, line 4, delete "(28)";

line 7, delete "(30)".

Claim 19, line 4, delete "(28)";

line 7, delete "(32)";

line 9, delete "(34)";

line 11, delete "(36)".

Claim 20, line 4, delete "(28)";

line 6, delete "(40)";

line 9, delete "(32)";

line 11, delete "(34)";

line 13, delete "(36)".

Claim 21, line 1, delete "or 20".

Claim 22, line 1, delete "any of the previous";

line 2, change "claims" to --claim 16--.

REMARKS

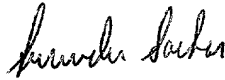
Favorable consideration of this application, as presently amended, is respectfully requested.

The present Preliminary Amendment is submitted to place the above-identified application in more proper format under United States practice. By the present Preliminary Amendment the specification has been amended to include suggested headings. The claims have been amended to no longer recite any reference numerals or multiple dependencies.

The present application is believed to be in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Registration No. 25,599
Attorney of Record
Surinder Sachar
Registration No. 34,423



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PATENT TRADEMARK OFFICE

(703) 413-3000

Fax #: (703)413-2220

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TITLE OF THE INVENTION: PROCEDURE AND SYSTEM FOR POSITION
MANAGEMENT IN A MOBILE TELEPHONE
SYSTEM

5 The present invention relates to a method and a system
for position management of mobile stations in a cellular
mobile telephone system.

Background of the invention

10 In order to get possibility to connect incoming calls
or transmit data to a mobile station in a cellular mobile
system, it is very important that the system can locate or
determine the position for the mobile station. The
procedure or the function to keep count of the position of
15 a mobile station within the mobile system is in the trade
called "Location Management", which in this text is called
position management. Position management requires
signalling via radio, which consequently implies that a
certain part of the total radio capacity in a cellular
20 system is needed for this type of signalling, which here
for the sake of convenience is called position signalling.
In order to make most possible share of the limited radio
capacity possible to use for voice respective data traffic,
the position management must be optimized so that it takes
25 a minimum of the available radio resource. The degree of
difficulty of the optimizing problem is increased by the
fact that the mobile stations are just, as the name
indicates, mobile.

30 In prior art the strategy for position management is
to find a suitable compromise between signalling in uplink,

i.e. from the mobile station to one in the mobile system permanent installed network of base stations, and signalling in downlink, i.e. from the network of base stations to a mobile station. Signalling in downlink is normally executed by searching, also called "paging", whereby a signalling message is transmitted from the network, to search for a mobile station in a limited area, a so called "Routing Area" (RA) which consists of one or more cells. Signalling in uplink is executed by a mobile station at intervals transmitting a message to the network, which by that can keep count of where the mobile station is at the moment. Updating of the position of the mobile station is made on one hand at change of cell, which is called "Cell Update" (CU), and on the other at change of Routing Area, which in its turn consequently is called "Routing Area Update" (RAU).

In a mobile telephone system which supports packet switched services, for instance according to the specification which in English is called General Packet Radio Service and is abbreviated GPRS, the capacity and the radio resource is utilized in a comparatively cost efficient way. This is due to the fact that a given GPRS mobile station utilizes a radio channel only when there are data that shall be transmitted or received by this mobile station. In GPRS there are specified three states of a mobile station. i.e. "Idle State", "Ready State" and "Standby State", at which there are different operations for position management at each of the different states. In the Idle State, the mobile station is not connected to the network, and the network therefore has no information about

the position of the mobile station. When the mobile station is in Ready State or in Standby State, it can, on the contrary, receive paging messages and it also can execute Routing Area Update (RAU), respective Cell Update (CU).

5 When the mobile station is in Ready State and it changes cell, a Cell Update (CU) is executed if the cells belong to the same routing area. If the new cell which the mobile station enters into also belongs to a new routing area, a Cell Update (CU) is executed combined with a Route
10 Area Update (RAU). In the Ready State there are in fact two "sub-states". Firstly "Receive/Transfer Mode", i.e. receiving/transmission mode, which is the state that usually is used at reception respective transmission of voice respective data traffic. Secondly, "Wait Mode", which
15 implies one by a time parameter limited waiting state, at which the time parameter indicates a time during which the mobile station shall remain in Ready State/Wait Mode in order to later switch to Standby State. At Standby State only Routing Area Update (RAU) is executed when the mobile
20 station changes routing area.

Prior art

25 The signalling load which is to be referred to the position management depends on the size of the routing area, and the time which the time parameter indicates. Within known technology there has since a long time been attempts at minimizing this signalling load by means of optimization of the size of the routing area.

The aim of the invention

An aim of the invention and the overall problem to be solved is to further minimize the signalling load which depends on the position management. One in this context new
5 problem, which is an aspect of said overall problem, is to determine a time parameter which at each state of the mobile station minimizes the position management depending signalling load.

10 Summary of the invention

The invention is based on the understanding that the problem can be solved by setting the value of the time parameter in relation to the speed of a mobile through a cell network.

15 If the mobile station is stationary or is moving slowly, in the cell network, the time parameter is, according to the invention, set at a comparatively high value. This results in that the mobile station will for a longer time be in the Ready State and no paging need to be
20 executed, because the network knows exactly in which cell the mobile station is. The paging signalling, i.e., the signalling in downlink, therefore is significantly reduced. Because the mobile station is stationary, or only moving slowly, no or very low frequent Cell Updates (CU) are
25 needed, which consequently results in low signalling also in uplink.

If, on the other hand, the mobile station is moving rapidly through cell network, the time parameter is, according to the invention, set at a comparatively small
30 value. This in its turn results in that the mobile station

is in Ready State during a shorter time, and instead more rapidly changes into the Standby State. This also results in a lower number of Cell Updates (CU) and, when necessary, Routing Area Updates (RAU) are executed, which consequently
5 results in reduced signalling in uplink.

Consequently the above mentioned problem is solved by the time parameter which controls the time during which a mobile station is in Ready State/Wait Mood being set adaptively depending on the present speed of a mobile
10 station through a cell network.

Brief description of Figures

The invention now will be explained by means of different embodiments and with reference to enclosed
15 figures in which:

Figure 1 illustrates a simplified state diagram for a mobile station in a GPRS-system;

Figure 2 illustrates a sketch of the principle of a cellular mobile telephone system according to the
20 invention;

Figure 3A, 3B and 3C illustrates the principle of a base station, respective a mobile station, according to the invention.

25 Detailed description of embodiments

Procedure:

One embodiment of the invention consists of a procedure to reduce the signalling load in a cellular
30 mobile telephone system which supports packet switched

services. One in the mobile telephone system included mobile station is switched between a first mode in a first state, here called Ready State, respective a second state, here called Standby State, depending on time parameter which indicates a time during which the mobile station shall remain in the first state in order to, after that, change to the second state. Figure 1 shows a simplified state diagram for such a mobile station, which can take an "Idle State", 2, a "Ready State" 4, and a "Standby State" 6. The Ready State includes 2 modes, that is "Wait Mode" 3, respective "Receive/Transfer"-mode 5. The mobile station changes at a GPRS-connection 8 from the Idle State 2, to the Ready State 4, and at a GPRS-disconnection 10 from the Ready State 4, back to the Idle State 2. The mobile station is in Ready State/Wait Mode 4/3 during an adjustable time which is controlled by said time parameter, and changes state at a change 12 to the Standby State 6 at the expiration of the set time. At transmission or at signalling about incoming voice or data traffic, the mobile station changes state in a change 14 to the Ready State 4 and Receive/Transfer Mode 5.

There also may be a time circuit for control of the duration of the Standby State 6 of the mobile station, and at the expiration of a pre-set standby time, the mobile station changes state in a change 16 to the Idle State 2.

As has been explained in the description of the background of the invention signalling are, in the different states, executed which can be related to determining of position of the mobile station. To sum up, the time parameter should, to effect a minimization of this

signalling load, have a comparatively big value when the mobile station is stationary or is moving slowly, and a comparatively small value when the mobile station is moving rapidly. According to the invention, an adaptive adjustment of the time parameter is attained by the value of the time parameter being set currently, depending on the actual speed of the mobile station through the cell network of the mobile telephone system. The value of the time parameter can be set or adapted for instance regularly, irregularly or in response to one in advance defined occurrence.

In a first embodiment of the procedure, the time parameter of the mobile station is given a predefined value at the entry of the mobile station into the mobile telephone system, and after that the time parameter is reduced at a cell update according to a predefined rule. This rule can, for instance, be so designed that the value of the time parameter is halved at a cell update, preferably at each such cell update. If the mobile station is moved at a high speed through the cell network, a lot of cell updates are executed, and by that a rapid reduction of the value of the time parameter. Consequently the time during which the mobile station is in the Ready State, and by that also the signalling load, is reduced.

In a second embodiment of the procedure, the time parameter of the mobile station is, as in the first embodiment, given a predefined value at the entry of the mobile station into the mobile telephone system. The speed of the mobile station through the cell network is estimated currently, and at cell update the estimated speed is reported to the network. After that, the speed of the

mobile station is adapted according to a predefined rule which may be the same rule as is used at the entry of the mobile station into the system.

The time parameter can, for instance, be set according to a table in which different time parameters for different speed intervals are described. In the case that there are corresponding time parameters at the mobile station, respective the cell network, said time parameter at the mobile station and said corresponding time parameter at the cell network are changed essentially at the same time.

Speed estimation can be performed in one in itself known way, for instance as is described in any of the publications: M.Andersin, "An Algorithm for Mobile Speed Estimation in Cellular Networks", Technical Report, 5/0363-04/FCPA 109 0001, Telia Research, January 1997; A.Sampath and J.M.Holtzman; "Estimation of Maximum Doppler Frequency for Handoff Decisions", Proceedings: IEEE 43rd Vehicular Technology Conference, VTC-93, pp.859-862, Secaucus, New Jersey, May 1993; or Ling Wang, Marko Silventoinen, Zhichun Honkasalo; "A New Algorithm For Estimating Mobile Speed at the TDMA-based Cellular System", Nokia Research Center, Heikkiläntie 7, SF-00211 Helsinki, Finland.

Mobile telephone system and mobile station:

Figure 2 illustrates the principle of a cellular mobile telephone system 18 which supports packet switched services. The system includes a network of cells 20 which are served by a base station 22 for each. One in the mobile telephone system included mobile station 24 is transferred through the cell network according to a speed vector 25.

According to what has been described above, the mobile station is switched between a first mode in a first state, here called Ready State, respective a second mode, here called Standby State, depending on a time parameter which
5 indicates a time during which the mobile station shall remain in the first state in order to after that switch to the second state. A mobile telephone system and/or a mobile station according to the invention, includes means 26 to currently set the size of the time parameter or value
10 depending on the current speed of the mobile station through the cell network of the mobile telephone system.

The in the system included means for execution of the procedure according to the invention to some extent exists in a base station 22 or in a mobile station 24. Actually
15 there are, for most of the means, cooperating and possibly communicating devices on the one hand in the base station, and on the other in the mobile station, and how these devices are allocated, depend on the selection of implementation. For the sake of clarity are in the
20 following figures 3A, 3B, 3C shown both a base station 22 and a mobile station 24 equipped with said means.

Figure 3A shows in principle a first embodiment of a base station 22, respective a mobile station, which includes means 28 to allocate to the time parameter of the
25 mobile station a predefined value at the entry of the mobile station into the mobile telephone system, and means 30 to, at a cell update reduce the value of the time parameter according to a predefined rule. For instance, the value of the time parameter can be halved at a cell

update, preferably, but not necessary, at each cell update.

Figure 3B illustrates a second embodiment including means 28 for allocating the time parameter of the mobile station a predefined value at the entry of the mobile station into the mobile telephone system, means 32 to currently estimate the speed of the mobile station through the cell network, means 34 to report an estimated speed to the network at cell update, and means 36 to adapt the value of the time parameter to the speed of the mobile station according to a predefined rule.

Figure 3C illustrates a third embodiment including means 38 to report an estimated speed of the mobile station at its entry into the mobile telephone system, means 40 to set the time parameter of the mobile station according to a predefined rule depending on the speed, means 32 to currently estimate the speed of the mobile station through the cell network, and means 34 to, at cell update, report the estimated speed to the network, and means 36 to adapt the value of the time parameter to the speed of the mobile station according to a predefined rule. Possibly, but not necessarily, the means 36 and 40 can be the same.

In different embodiments the time parameter is set according to a table in which different time parameters for different time intervals are described. To the extent that said time parameter has a corresponding time parameter in the cell network, these are changed essentially at the same time.

PATENT CLAIMS

1. Procedure to reduce the signalling load in a cellular mobile telephone system which supports packet switched services, at which one in the mobile telephone system included mobile station is switched between a first mode in a first state, here called Ready State, respective a second state, here called Standby State, depending on a time parameter which indicates a time during which the mobile station shall remain in the first state in order to after that change to the second state, characterized in the step to currently set the value of the time parameter depending on the current speed of the mobile station through the cell network of the mobile telephone system.

2. Procedure to set a time parameter in a cellular, i.e. one of a cellular network built up, mobile telephone system which supports packet switched services, at which one in the mobile telephone system included mobile station is switched between a first mode in a first state, here called Ready State, respective a second state, here called Standby State, depending on said time parameter which indicates a time during which the mobile station shall remain in the first state in order to after that change to the second state, characterized in the step to currently set the value of the time parameter depending on the current speed of the mobile station through the cell network of the mobile telephone system.

3. Procedure according to patent claim 1 or 2,
further c h a r a c t e r i z e d in the steps to:

- at the entry of a mobile station into the mobile
telephone system allocate the time parameter of the mobile
5 station a predefined value; and to
- at a cell update reduce the time parameter according
to a predefined rule.

4. Procedure according to patent claim 3,
10 c h a r a c t e r i z e d in that the value of the time
parameter is halved at a cell update.

5. Procedure according to patent claim 1 or 2, further
c h a r a c t e r i z e d in the steps to:

- 15 - at the entry of a mobile station into the mobile
telephone system, allocate the time parameter of the mobile
station a predefined value;
- currently estimate the speed of the mobile station
through the cell network;
- 20 - at cell update report an estimated speed to the
network; and to
- adapt the time parameter of the mobile station
according to a predefined rule.

25 6. Procedure according to patent claim 1 or 2,
further c h a r a c t e r i z e d in the steps to:

- at the entry of a mobile station into the mobile
telephone system, report an estimated speed of the mobile
station;

- set the time parameter of the mobile station according to a predefined rule depending on the speed;
- currently estimate the speed of the mobile station through the cell network;
- 5 - at cell update report the estimated speed to the network; and to
- after that adapt the speed of the mobile station according to a predefined rule.

10 7. Procedure according to patent claim 5 or 6, characterized in that the time parameter is set according to a table in which different time parameters for different speed intervals are described.

15 8. Procedure according to any of the previous patent claims, characterized in that said time parameter of the mobile station and a corresponding time parameter of the cellular network are changed essentially at the same time.

20 9. A cellular mobile telephone system (18) which supports packet switched services, at which one in the mobile telephone system included mobile station (24) is switched between a first mode in a first state, here called
25 Ready State, respective a second state, here called Standby State, depending on a time parameter which indicates a time during which the mobile station shall remain in the first state in order to after that change to the second state, characterized in means (26) to currently set
30 the value of the time parameter depending on the current speed of the mobile station through the cell network of the mobile telephone system.

10. Mobile telephone system according to patent claim 9, further c h a r a c t e r i z e d in that there are included:

- means (28) to allocate the time parameter of the mobile station a predefined value at the entry of the mobile station into the mobile telephone system; and
- means (30) to, at a cell update, reduce the value of the time parameter according to a predefined rule.

11. Mobile telephone system according to patent claim 10, c h a r a c t e r i z e d in that the value of the time parameter is halved at a cell update.

12. Mobile telephone system according to patent claim 9, further c h a r a c t e r i z e d in that there are included:

- means (28) to allocate the time parameter of the mobile station a predefined value at the entry of the mobile station into the mobile telephone system;
- means (32) to currently estimate the speed of the mobile station through the cell network;
- means (34) to report an estimated speed to the network at cell update; and
- means (36) to adapt time parameter to the speed of the mobile station according to a predefined rule.

13. Mobile telephone system according to patent claim 9, further c h a r a c t e r i z e d in that there are included:

- means (38) to report an estimated speed of the mobile station at its entry into the mobile telephone system;
- means (40) to set the time parameter of the mobile station according to a predefined rule depending on the speed;
- means (32) to currently estimate the speed of the mobile station through the cell network;

- means (34) to, at cell update, report the estimated speed to the network; and
- means (36) to adapt the time parameter to the speed of the mobile station according to a predefined rule.

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14. Mobile telephone system according to patent claim 12 or 13, c h a r a c t e r i z e d in that the time parameter is set according to a table in which different time parameters for different time intervals are described.

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15. Mobile telephone system according to any of the previous patent claims, c h a r a c t e r i z e d in that said time parameter of the mobile station and a corresponding time parameter of the cell network are

15 changed essentially at the same time.

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16. A mobile station (24) included in a cellular mobile telephone system which supports packet switched services, at which the mobile station is switched between a first mode in a first state, her called Ready State, respective a second state, here called Standby State, depending on a time parameter which indicates a time during which the mobile station shall remain in the first state in order to after that switch to the second state,

20 c h a r a c t e r i z e d in means (26) to currently set the value of the timeparameter depending on the current speed of the mobile station through the cell network of the mobile telephone system.

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17. Mobile station according to patent claim 16, further c h a r a c t e r i z e d in that there are included:

- means (28) to allocate the time parameter of the mobile station a predefined value at the entry of the mobile
- 35 station into the mobile telephone system; and

35

- means (30) to, at a cell update, reduce the time parameter according to a predefined rule.

18. Mobile station according to patent claim 17,
5 c h a r a c t e r i z e d in that the value of the time parameter is halved at a cell update.

19. Mobile station according to patent claim 16,
further c h a r a c t e r i z e d in that there are
10 included:
- means (28) to allocate the time parameter of the mobile station a predefined value at the entry of the mobile station into the mobile telephone system;
- means (32) to currently estimate the speed of the mobile
15 station through the cell network;
- means (34) to report an estimated speed to the network at cell update; and
- means (36) to adapt time parameter to the speed of the mobile station according to a predefined rule.

20
20. Mobile station according to patent claim 16,
further c h a r a c t e r i z e d in that there are
included:
- means (38) to report an estimated speed of the mobile
25 station at its entry into the mobile telephone system;
- means (40) to set the time parameter of the mobile station according to a predefined rule, depending on the speed;
- means (32) to currently estimate the speed of the
30 mobile station through the cell network;
- means (34) to, at cell update, report the estimated speed to the network; and
- means (36) to adapt the time parameter to the speed of the mobile station according to a predefined rule.

21. Mobile station according to patent claim 19 or 20, characterized in that the time parameter is set according to a table in which different time parameters for different speed intervals are described.

5

22. Mobile station according to any of the previous patent claims, at which said time parameter of the mobile station and a corresponding time parameter of the cell network are changed essentially at the same time.

1/3

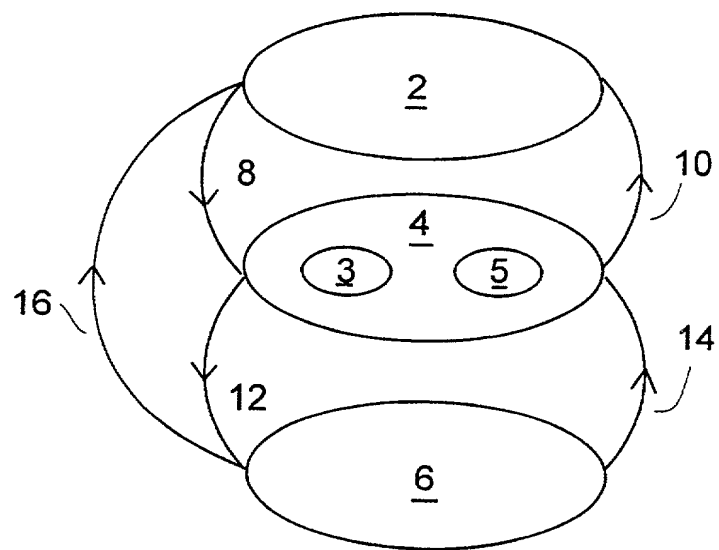


Figure 1

2/3

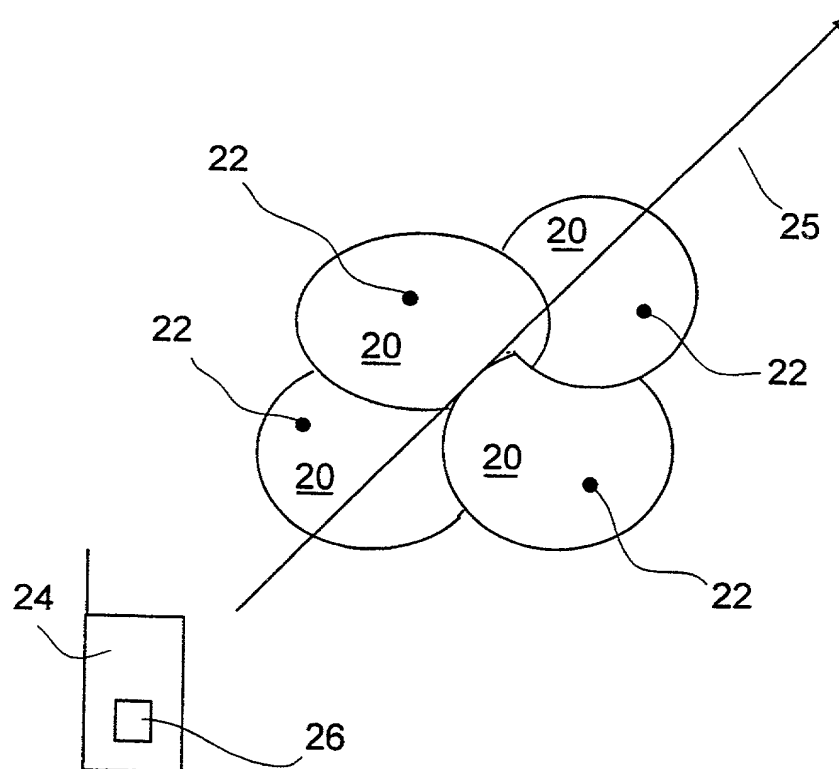


Figure 2

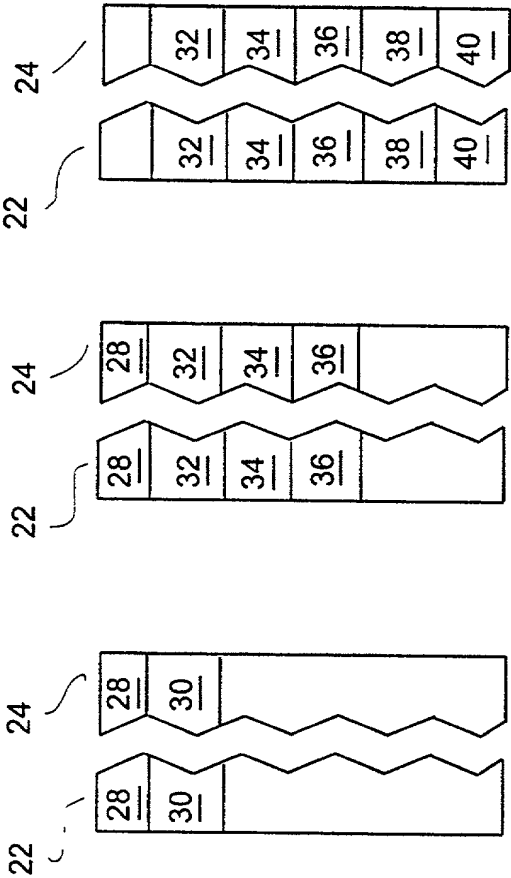


Figure 3C

Figure 3B

Figure 3A

Declaration, Power Of Attorney and Petition

#

Page 1 of 3

WE (I) the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first, and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PROCEDURE AND SYSTEM FOR POSITION MANAGEMENT IN A MOBILE TELEPHONE SYSTEM

the specification of which

☐ is attached hereto.

☒ was filed on 22 June 2000 as

Application Serial No. _____

and amended on _____.

☒ was filed as PCT international application

Number PCT/SE98/02357

on 17 December 1998,

and was amended under PCT Article 19

on _____ (if applicable).

We (I) hereby state that we (I) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We (I) acknowledge the duty to disclose information known to be material to the patentability of this application as defined in Section 1.56 of Title 37 Code of Federal Regulations.

We (I) hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed. Prior Foreign Application(s)

Application No.	Country	Day/Month/Year	Priority Claimed
<u>9704863-1</u>	<u>SWEDEN</u>	<u>23 December 1997</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No

We (I) hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

_____ (Application Number)	_____ (Filing Date)
_____ (Application Number)	_____ (Filing Date)

We (I) hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

Application Serial No.	Filing Date	Status (pending, patented, abandoned)
PCT/SE98/02357	17 December 1998	
_____	_____	_____
_____	_____	_____

And we (I) hereby appoint: Norman F. Oblon, Reg. No. 24,618; Marvin J. Spivak, Reg. No. 24,913; C. Irvin McClelland, Reg. No. 21,124; Gregory J. Maier, Reg. No. 25,599; Arthur I. Neustadt, Reg. No. 24,854; Richard D. Kelly, Reg. No. 27,757; James D. Hamilton, Reg. No. 28,421; Eckhard H. Kuesters, Reg. No. 28,870; Robert T. Pous, Reg. No. 29,099; Charles L. Gholz, Reg. No. 26,395; Vincent J. Sunderdick, Reg. No. 29,004; William E. Beaumont, Reg. No. 30,996; Robert F. Gnuse, Reg. No. 27,295; Jean-Paul Lavalleye, Reg. No. 31,451; Stephen G. Baxter, Reg. No. 32,884; Robert W. Hahl, Reg. No. 33,893; Richard L. Treanor, Reg. No. 36,379; Steven P. Weihrouch, Reg. No. 32,829; John T. Goolkasian, Reg. No. 26,142; Richard L. Chinn, Reg. No. 34,305; Steven E. Lipman, Reg. No. 30,011; Carl E. Schlier, Reg. No. 34,426; James J. Kulbaski, Reg. No. 34,648; Richard A. Neifeld, Reg. No. 35,299; J. Derek Mason, Reg. No. 35,270; Surinder Sachar, Reg. No. 34,423; Christina M. Gadiano, Reg. No. 37,628; Jeffrey B. McIntyre, Reg. No. 36,867; Paul E. Rauch, Reg. No. 38,591; William T. Enos, Reg. No. 33,128; and Michael E. McCabe, Jr., Reg. No. 37,182; our (my) attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith; and we (I) hereby request that all correspondence regarding this application be sent to the firm of OBLON, SPIVAK, McCLELLAND, MAIER & NEUSTADT, P.C., whose Post Office Address is: Fourth Floor, 1755 Jefferson Davis Highway, Arlington, Virginia 22202.

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

1-00
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✓ 
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✓ 13 aug 2000
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Signature of Inventor

✓ 24 aug 2000
Date

NAME OF THIRD JOINT INVENTOR

Signature of Inventor

Date

NAME OF FOURTH JOINT INVENTOR

Signature of Inventor

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